PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Arjen BRANDSMA

Serial No. (unknown)

Filed herewith

TRANSMISSION BELT PROVIDED
WITH TRANSVERSE ELEMENTS HAVING
A DISPLACEABLE CONTACT LINE

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please amend the above-identified application as follows:

Please replace the paragraph on page 3, beginning at line 6. with the following rewritten paragraph:

--A further and surprising advantage of the transmission belt according to the invention is that, when it passes along the bent trajectory part the positional accuracy of the transverse elements with respect to the pulley sheaves is advantageously effected. In particular the tendency of the elements to tilt about an axial of the transmission belt is reduced. When the rocking edge extends in radially inward direction to about half a radial dimension of an axial side face of the elements that is contacting the pulleys, a particularly stable configuration is achieved. This advantage enables that the finishing processing of a protrusion and hole combination, which is incorporated in the known transverse elements for alignment and/or positioning of the elements by the protrusion protruding from the said principle plane of a first element into the hole of an adjacent element, can now be

less accurate. A protruding height of the protrusion may even be less pronounced with respect to the overall dimensioning of the transmission belt, because in the belt according to the invention it predominantly serves to align and/or position the elements when they pass from one pulley to the other in the pushing trajectory part where the tilting angle is approximately zero. Accordingly, a further embodiment of the invention is characterised in that the protruding height of the protrusion is smaller than a maximum tilting clearance between two mutually contacting elements when they pass along the bent trajectory part between the sheaves of the pulley, at least when measured in the longitudinal of the belt, i.e. the tangential direction, at the location of the protrusion.--

Please replace the paragraph on page 4, beginning at line 10, with the following rewritten paragraph:

--It is noted that the publication, JP-A-2000-074150, discloses a belt's transverse element having the said protrusion/hole combination as well as a rocking edge showing a curvature having a radius defined between a minimum value determined by the maximum permissible Herzian stress acting on said rocking edge at any speed ratio of transmission and a maximum value determined by the precondition that a total of clearances including a clearance caused by the Herzian stress acting on the rocking edge is smaller than a protruding height of the element's protrusion part. This document does not indicate either of the invented requirements or the effects thereof disclosed by the present invention.--

Please replace the paragraph on page 5, beginning at line 13, with the following rewritten paragraph:

--In figure 2 a view in the longitudinal direction of the drive belt and in a side elevation thereof is provided. In this example of the transmission belt 4 according to the invention it is shown that the carrier 9 is composed of two

sets of radially stacked endless strips, alternatively denoted rings 9'. The elements 5 are provided with a protrusion part 10 protruding from a principle plane 11 thereof, for interaction with a hole (not shown) provided a back side of the element 5, so as to mutually align and/or position two adjacent transverse elements 5. It is further indicated that there is provided a rocking edge 12 forming the transition between the principle plane 11 and a radially inner part 6 of the element 5, which inner part 6 is recessed in the longitudinal direction with respect to other parts of the elements 5. The rocking edge 12 and the recessed inner part 6 allow mutual tilting of the transverse elements 5 so that a part of the belt 4 may assume a bent trajectory as shown by the side elevation. Adjacent elements 5 contact over an axially oriented contact line 7 on the rocking edge 12. According to the invention the rocking edge 12 shows a curvature in the radial direction having a relatively large radius R. By this measure the contact line 7 displaces radially inwardly in dependence on the amount of mutually element tilting.--

IN THE CLAIMS:

Claims 3-7, 9-11, 13 and 14 have been amended as follows:

--3. (amended) The transmission belt (4) according to claim 1, characterised in that the curvature of the rocking edge (12) is defined by a plurality of radii (R) that continuously increase in a radially inward direction.--

--4. (amended) The transmission belt (4) according to claim 1, characterised in that the curvature of the rocking edge (12) is substantially elliptical.--

--5. (amended) The transmission belt (4) according to claim 1, characterised in that the radius or radii (R) of the curvature of the rocking edge (12) lies or lie in the range between 20 mm and 180 mm, preferably between 30 mm and 150 mm, or around 40 mm.--

--6. (amended) The transmission belt (4) according to claim 1, characterised in that each transverse element (5) is provided with a protrusion (10) longitudinally protruding from a principle plane (11) thereof, having a protruding height that is smaller than a maximum tilting clearance (C) in the belt's longitudinal direction at the location of the protrusion (11) between two mutually contacting elements (5).--

--7. (amended) The transmission belt (4) according to claim 1, characterised in that in the radial direction of the transmission belt (4) the rocking edge (12) at least partly coincides with the endless carrier (9).--

--9. (amended) The transmission belt (4) according to claim 7, characterised in that the transverse element (5) is provided with an axial side face (8) for contact with a pulley (2, 3) of the transmission (1) and in that in the rocking edge (12) extends in the radially direction to approximately half a radial dimension of the axial side face (8).--

--10. (amended) A transverse element (5) for application in the transmission belt (4) according to claim 1, characterised in that the transverse element (5) is manufactured by punching.--

--11. (amended) A continuously variable transmission (1) provided with the transmission belt (4) according to claim 1.--

--13. (amended) The continuously variable transmission (1) according to claim 11, characterised in that the curvature of the rocking edge (12) is defined such that at a minimum radius of a bent trajectory part (RMIN) of the belt (4) the displacement of the contact line (7) is at a maximum.--

--14. (amended) A vehicle provided with a transmission (1) according to claim 11.--

R E M A R K S

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

YOUNG & THOMPSON

By _____

Thomas W. Perkins
Attorney for Applicant
Registration No. 33,027
Customer No. 00466
745 South 23rd Street
Arlington, VA 22202
Telephone: 703/521-2297

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please replace the paragraph on page 3, beginning at line 6. with the following rewritten paragraph:

--A further and surprising advantage of the transmission belt according to the invention is that, when it passes along the bent trajectory part the positional accuracy of the transverse elements with respect to the pulley sheaves is advantageously effected. In particular the tendency of the elements to tilt about an axial of the transmission belt is reduced. When the rocking edge extends in radially inward direction to about half a radial dimension of an axial side face of the elements that is contacting the pulleys, a particularly stable configuration is achieved. This advantage enables that the finishing processing of a ~~notch~~protrusion and hole combination, which is incorporated in the known transverse elements for alignment and/or positioning of the elements by the ~~notch~~protrusion protruding from the said principle plane of a first element into the hole of an adjacent element, can now be less accurate. A protruding height of the ~~notch~~protrusion may even be less pronounced with respect to the overall dimensioning of the transmission belt, because in the belt according to the invention it predominantly serves to align and/or position the elements when they pass from one pulley to the other in the pushing trajectory part where the tilting angle is approximately zero. Accordingly, a further embodiment of the invention is characterised in that the protruding height of the ~~notch~~protrusion is smaller than a maximum tilting clearance between two mutually contacting elements when they pass along the bent trajectory part between the sheaves of the pulley, at least when measured in the longitudinal of the belt, i.e. the tangential direction, at the location of the ~~notch.~~ protrusion.--

Please replace the paragraph on page 4, beginning at line 10, with the following rewritten paragraph:

--It is noted that the publication, JP-A-2000-074150, discloses a belt's transverse element having the said ~~notch/hole~~protrusion/hole combination as well as a rocking edge showing a curvature having a radius defined between a minimum value determined by the maximum permissible Herzian stress acting on said rocking edge at any speed ratio of transmission and a maximum value determined by the precondition that a total of clearances including a clearance caused by the Herzian stress acting on the rocking edge is smaller than a protruding height of the element's ~~notch~~protrusion part. This document does not indicate either of the invented requirements or the effects thereof disclosed by the present invention.--

Please replace the paragraph on page 5, beginning at line 13, with the following rewritten paragraph:

--In figure 2 a view in the longitudinal direction of the drive belt and in a side elevation thereof is provided. In this example of the transmission belt 4 according to the invention it is shown that the carrier 9 is composed of two sets of radially stacked endless strips, alternatively denoted rings 9'. The elements 5 are provided with a ~~notch~~protrusion part 10 protruding from a principle plane 11 thereof, for interaction with a hole (not shown) provided a back side of the element 5, so as to mutually align and/or position two adjacent transverse elements 5. It is further indicated that there is provided a rocking edge 12 forming the transition between the principle plane 11 and a radially inner part 6 of the element 5, which inner part 6 is recessed in the longitudinal direction with respect to other parts of the elements 5. The rocking edge 12 and the recessed inner part 6 allow mutual tilting of the transverse elements 5 so that a

part of the belt 4 may assume a bent trajectory as shown by the side elevation. Adjacent elements 5 contact over an axially oriented contact line 7 on the rocking edge 12. According to the invention the rocking edge 12 shows a curvature in the radial direction having a relatively large radius R. By this measure the contact line 7 displaces radially inwardly in dependence on the amount of mutually element tilting.--

IN THE CLAIMS:

Claims 3-7, 9-11, 13 and 14 have been amended as follows:

--3. (amended) The transmission belt (4) according to claim 1~~ or 2~~, characterised in that the curvature of the rocking edge (12) is defined by a plurality of radii (R) that continuously increase in a radially inward direction.--

--4. (amended) The transmission belt (4) according to claim 1,~~2 or 3,~~ characterised in that the curvature of the rocking edge (12) is substantially elliptical.--

--5. (amended) The transmission belt (4) according to ~~one of the claims 1-4,~~claim 1, characterised in that the radius or radii (R) of the curvature of the rocking edge (12) lies or lie in the range between 20 mm and 180 mm, preferably between 30 mm and 150 mm, or around 40 mm.--

--6. (amended) The transmission belt (4) according to ~~one of the previous claims,~~claim 1, characterised in that each transverse element (5) is provided with a ~~notch~~protrusion (10) longitudinally protruding from a principle plane (11) thereof, having a protruding height that is smaller than a maximum

tilting clearance (C) in the belt's longitudinal direction at the location of the ~~notch~~protrusion (11) between two mutually contacting elements (5).--

--7. (amended) The transmission belt (4) according to ~~one of the previous claims,~~claim 1, characterised in that in the radial direction of the transmission belt (4) the rocking edge (12) at least partly coincides with the endless carrier (9).--

--9. (amended) The transmission belt (4) according to claim 7~~ or 8~~, characterised in that the transverse element (5) is provided with an axial side face (8) for contact with a pulley (2, 3) of the transmission (1) and in that in the rocking edge (12) extends in the radially direction to approximately half a radial dimension of the axial side face (8).--

--10. (amended) A transverse element (5) for application in the transmission belt (4) according to ~~any of the preceding claims,~~claim 1, characterised in that the transverse element (5) is manufactured by punching.--

--11. (amended) A continuously variable transmission (1) provided with the transmission belt (4) according to ~~one of the claims 1-9.--~~claim 1.--

--13. (amended) The continuously variable transmission (1) according to claim 11~~ or 12~~, characterised in that the curvature of the rocking edge (12) is defined such that at a minimum radius of a bent trajectory part (RMIN) of the belt (4) the displacement of the contact line (7) is at a maximum.--

--14. (amended) A vehicle provided with a transmission

(1) according to claim 11~~, 12 or 13~~.--